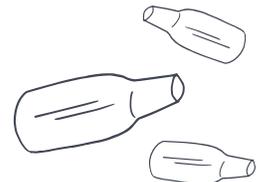




RACE OVERVIEW



The actual racing part of the competition is the exciting culmination of the CO₂ car project. It's the moment of truth – when all the hard work of building a dragster becomes evident.

But just because the car is built doesn't mean that the learning stops. Here, students discover the validity of their design concepts in a way that even prerace testing couldn't reveal. Some students will want to run directly to the shop to modify their car to squeeze out a little more speed. Some are also careful to observe their classmates' cars in action and evaluate their designs.

Best of all, the competition is fun!



THE RACE: HOW IT WORKS

It's pretty simple: two cars race side by side over a distance of 20 meters (65 feet, 7.5 inches).



THE LAUNCH

The cars are placed in front of the launch pods. When the launch button is pushed, an electronic impulse simultaneously triggers the two launch pods, which in turn activate the steel firing pins that punch small holes in the CO₂ cartridges and start the digital timers.

The previously confined liquid CO₂ instantly begins to boil and escape from the nozzle. The action-reaction principle takes over, thrusting the cars from the launcher and toward the finish line.



DOWN THE TRACK

As the cars zoom toward the finish line, each is prevented from flying off the track by a strand of monofilament line. The line is threaded through the screw eyes mounted on the underside of the car body.

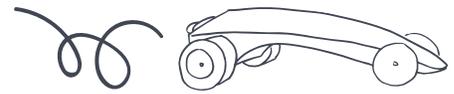


THE FINISH

As the cars pass through the finish gate, they break two infrared light beams, stopping the digital timers (this is true of digital launch systems, not mechanical systems where a person with a stopwatch is required to get a race time). The system captures and displays the times to the nearest thousandth of a second and uses flashing lights to indicate the winner's lane.

Carefully folded and placed towels decelerate the cars after they cross the finish line.

RACE SAFETY



Nothing ruins an awesome event more than an accident due to a lack of safety precautions. Prevent any possible hazards by following the race safety guidelines below as well as any in your race system's instruction manual.

SAFE RACETRACK LOCATION

Conducting a safe race requires a good location for your racetrack with plenty of space. Races are often held in gymnasiums, assembly areas, or long hallways. Consider the track length, usually about 80 feet (including the pre-race staging and postrace parking areas), when selecting a location.

The finish end of the track should be near a wall or at least in an area where there is no spectator traffic.

RESTRICT TRAFFIC AROUND TRACK

Because a CO₂ race is a thrilling spectator event, you might have curious onlookers milling about before and during your race.

We strongly recommend that you put up some kind of barricade to keep spectators a safe distance (five to six feet should do) from the track. This will prevent someone from bumping into the track setup. If you locate the track near a wall, then you will need to barricade only one side.





SELECT AND TRAIN RACE STAFF

Good help is essential! You'll need one to four people on the start end to stage the race cars. You'll also need one to four people on the finish end to remove the cars after each race and to reset the deceleration towels.

Select responsible people and spend a few minutes training them to do their tasks. Stress the importance of communication between staff members at the start and finish ends. Cars should never be launched until the finish end official gives the "ready" signal. Officials may communicate with hand signals or two-way radios.

In addition to those operating the track, you might also need helpers to transport race cars and record times.

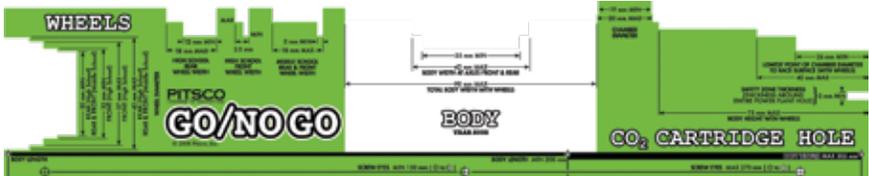
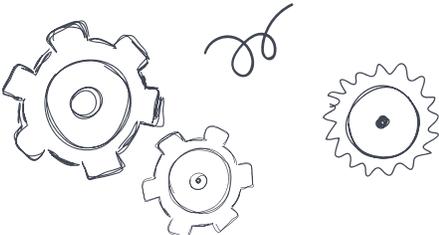
EXAMINE CARS FOR SAFETY

Cars should be examined before racing. If a car is missing one or both screw eyes, it could soar off the track at high speed (a bad thing).

Also, check cars for loose parts that might detach during the race, loose wheels, or flimsy power plant housings (cartridge holes). Determine whether unsafe cars should be repaired or simply denied the opportunity to race.



CHECK OUT:
METRIC DRAGSTER
GO/NO GO GAUGE





RACE SETUP



Races can be conducted on a smooth, level floor or on an elevated track.

Floor racing is an effective and economical way to race CO₂ cars. Most starting/timing systems – including all by Pitsco – come with the necessary hardware for a floor setup.

You'll want to ensure the floor surface is smooth, level, and clean. Cordon off the race area for the safety of cars and spectators. Also, for floor racing, special guideline anchors must be securely fastened to the floor.

Elevated track racing offers a few advantages: spectators can see the action better, and race staff have a much easier job of staging and removing cars when standing upright. As with floor racing, you should restrict traffic around the track; you don't want the track knocked awry in the middle of a race.

No matter which style of racing you choose, your track needs to be divided into specific zones, each with its own function critical to a successful race.

RACE ZONE

The official racing distance is 20 meters, or 65 feet and 7.5 inches. This distance is about 1:20 scale when compared to the quarter-mile distance traversed in professional drag racing. This scale is the same for comparing CO₂ racers to their full-size counterparts.



DECELERATION ZONE

Cars cross the finish line at a high speed, often up to 45 mph. To prevent car damage, it is necessary to stop the cars in a gentle manner. This is usually done by loosely rolling two towels lengthwise and laying them in the racing lanes just beyond the finish line.



STAGING AND PARKING ZONES

A staging area saves time by allowing multiple pairs of cars to be threaded onto the guidelines at once. Two cars at a time are pushed up to the starting line and engaged in the launch pods. After the cars race, the launch pods are temporarily moved aside and the next pair of cars are moved into race position.

A parking area must accommodate all the cars that were pre-staged. Also, it must be a safe distance from the deceleration zone to prevent car damage.



RACE HARDWARE

Many components work in concert during a successful race: a launch system that includes start gate/launch pods, track, finish gate/timing device, and more. There are many systems to choose from, including a variety from Pitsco that go from basic and mechanical to advanced and electronic.

Each component plays an important part in the race:

Start Gate/Launch Pods

- Simultaneously puncture CO₂ cartridges of both race cars
- Triggered by an electronic impulse or a mechanical device, depending on the system

Timing Device

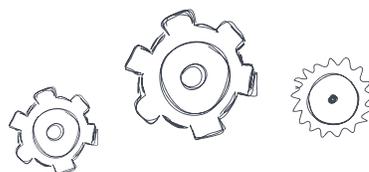
- Electronically times races in two lanes (accurate to nearest thousandth of a second)
- Timer starts when launchers are triggered.

Finish Gate

- Invisible light beam and infrared sensors detect car's presence at finish line.
- Either stops the digital timers and displays the times or simply indicates which lane had the fastest car

Track Hardware

- Monofilament guideline
- Guideline anchors

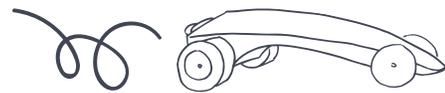


CHECK OUT:
IMPULSE G3 RACE SYSTEM





RULES AND SPECIFICATIONS



Organizations that sponsor CO₂ racing, such as the Technology Student Association (TSA), have developed detailed rules to govern racing events. Even if you're not affiliated with an organization, a set of rules can be beneficial to your racing event. Rules serve several purposes:

- Establish guidelines for scoring and determining event winners. Quite often, it's not the fastest car that wins a racing event. While track performance is a major part of the scoring, other factors might come into play, such as vehicle appearance, finish quality, wind tunnel performance, and the quality and accuracy of the car drawing. (Competitors are often required to submit a detailed, two-view drawing of their car.)
- Ensure safe race car construction. Many of the specifications for the car body measurements are designed to prevent parts of the car from detaching as the car rockets down the track. Minimum and maximum body length, wheelbase, power plant housing thickness, and car weight are a few examples. Any violation of the specifications is grounds for disqualification.
- Ensure fairness. All competitors receive a complete set of rules and specifications before they design and construct their cars, giving all an equal opportunity for victory.



LEARN MORE:
TECHNOLOGY STUDENT
ASSOCIATION



Make sure you have a complete list of the rules. Get familiar with them and refer to them frequently during the process of designing and building your car.

RACING BRACKETS

Brackets are a common way to organize a CO₂ racing event. Most often the event will be divided into phases:

1. Qualifying Round
2. Judging
3. Finals

QUALIFYING ROUND

During the qualifying round, also known as the time trials, all cars race and their times are recorded. During this round, the cars are not competing against the car in the next lane. They are simply racing to have their time recorded.

JUDGING

After all the cars have raced, the cars are ordered from fastest to slowest by their qualifying time. This is a good time to check the fastest cars against the official rules and specifications. Any car with a rule or spec violation should be disqualified from further competition. The idea is to select the 16 to 25 fastest cars that passed the judging process (number of cars will vary based on the bracket to be used during the finals). It's very common to disqualify a few cars for being under the minimum weight spec – such cars will have an unfair advantage.

FINALS

A bracket is typically used during the finals. A 16-car double-elimination bracket is most common. This is manageable time-wise and provides a good deal of drama for the competitors and spectators alike. During the finals, the cars compete against cars in the next lane. Double elimination means that a car must lose twice to be eliminated from the competition. Single elimination is also possible if time is limited.



DETAILED INSTRUCTIONS:
FOR RUNNING A RACE

DOWNLOAD A SAMPLE BRACKET



SINGLE
ELIMINATION,
16 CARS



SINGLE
ELIMINATION,
17 TO 32 CARS



DOUBLE
ELIMINATION,
16 CARS



DOUBLE
ELIMINATION,
17 TO 32 CARS

